We've finished the April 1, 2017 Water Supply Index (WSI) and Bulletin 120 (B120) forecasts. The forecasts include observed conditions through the end of March.

The forecasts are posted at:

WSI: http://cdec.water.ca.gov/cgi-progs/iodir/wsi
B120: http://cdec.water.ca.gov/cgi-progs/iodir?s=b120

Forecast Summary:

The projected median April-July (AJ) runoff in the major Sierra river basins ranges from 125 percent on the Sacramento River at Bend Bridge to 240 percent on the Kern River. All rivers south of the Feather River are forecast to have AJ runoff greater than 170 percent of average.

The WSI forecast is based on precipitation and flows observed through March 2017 and can be summarized as follows:

Sacramento River Unimpaired Runoff Water Year Forecast (50 percent exceedance)	**37.2 MAF (208 percent of average)**
Sacramento Valley Index (SVI) (50 percent exceedance)	**13.9 (Wet)**
San Joaquin Valley Index (75 percent exceedance)	**5.8 (Wet)**

Forecasting Record Water Year Runoff Volumes:
Due in large part to the high runoff volumes in January and February, the projected median Water Year forecasts for the Feather, Yuba, American, Mokelumne, Stanislaus, Truckee, and East Carson are predicting records. For other watersheds, record Water Year volumes are forecast in the 25 and 10 percent exceedance levels, and in the case of the Yuba and American Rivers the 99, 90, and 75 percent exceedance levels as well. Below is a table summarizing the basins where potential Water Year runoff records may be set based on the April 1 forecast.

	WY Forecast Percent Exceedance					
	99	**90**	**75**	**50**	**25**	**10**
Feather			X	X	X	X
Yuba	X	X	X	X	X	X
American	X	X	X	X	X	X
Cosumnes						X
Mokelumne				X		X
Stanislaus				X	X	X
Tuolumne					X	X
Truckee				X		
East Carson				X		
Sacramento River Region (SRR)					X	X
San Joaquin 4 Rivers (SJR)						X
Eight River Index (8RI)					X	X

Runoff:

After February, when the flow rate was near 400 percent of average, March data indicates a statewide flow of about 155 percent of average. During March, all rivers in the Sierra north of the Mokelumne flowed at a rate less than 170 percent of average. These rates are at the **lower end** of the flow rate range. All rivers farther south flowed at rates greater than 180 percent of average including the rivers south of the Merced that flowed at over 200 percent of average.

The percent of average Water Year flow-to-date for the three main regions (north to south) are 246, 350, and 282 percent of average (the combined flows for January and February were records for the Inflow to Shasta, the Kern River, and all rivers on the west side of the Sierra from the Feather River south to the Kings River.

Unimpaired flows for the 2016-2017 water year:

Region	October-March Runoff (%)	March Runoff (%)
Sacramento Valley Index (4 rivers)	246	147
San Joaquin Valley Index (6 rivers)	350	193
Tulare Lake Basin (4 rivers)	282	222

Precipitation:

The 83.5 inches of precipitation measured during October-March in the Northern Sierra 8-Station Index ranks as the highest total during that six-month span in the entire record of the 8-Station Index dating back to 1921. The previous high was 77.3 inches in 1983. As of this morning, the 8-Station Index seasonal total to date is 87.7 inches which is only 0.8 inches from the record of 88.5 inches which occurred 1983.

The 64.9 inches of precipitation measured during October-March in the San Joaquin 5-Station Index ranks as the 2nd highest total during that six-month span in the entire record of the 5-Station Index dating back to 1913. The current October-March record is 66.9 inches in 1983. As of this morning, the 5-Station Index seasonal total to date is 68.0 inches which currently ranks it as the 3rd wettest on record behind 1983 and 1995 with 77.4 and 70.0 inches, respectively.

The 43.2 inches of precipitation measured during October-March in the Tulare Basin 6-Station Index ranks as the 3rd highest total during that six-month span in the entire record of the 6-Station Index dating back to 1922. The top two wettest totals during October-March for the 6-Station Index are 50.0 and 48.8 inches in 1969 and 1983, respectively. As of this morning, the 6-Station Index seasonal total to date is 45.0 inches which currently ranks it as the 9th wettest on record.

Naturally there is a lot of curiosity to see how this spring's runoff will compare to both 2006 and 2011. One perspective is to compare precipitation totals during the spring months. Below is a table that compares this year's April-June precipitation to 2006 and 2011 for the 8-Station, 5-Station, and 6-Station indices

	8-Station Index			5-Station Index			6-Station Index		
	2006	2011	2017	2006	2011	2017	2006	2011	2017

April	12.04	3.40	4.30	10.78	1.87	3.09	7.27	1.56	1.80
May	1.48	4.88	--	1.56	3.52	--	0.87	2.53	--
June	0.32	2.95	--	0.08	2.77	--	0.07	0.88	--
July	0.00	0.02	--	0.61	0.04	--	0.64	0.58	--
Total	13.84	11.25	--	13.03	8.20	--	8.85	5.55	--

Precipitation for the 2016-2017 water year accumulated at the following rates of average:

Hydrologic Region	October-March precipitation (%)
Sacramento River	185
San Joaquin River	187
Tulare Lake	185
Statewide	175

Precipitation Index	Percent of Seasonal Average to Date through April 10, 2017
Northern Sierra 8-Station Index	204 (87.7 inches)
San Joaquin 5-Station Index	195 (68.0 inches)
Tulare Basin 6-Station Index	179 (45.0 inches)

Snowpack:

Snowpack is monitored using two complementary methods: automatic snow sensor (or "pillow") readings and manual snow course measurements. The snow sensors give us a daily snapshot of snow conditions while the manual snow course measurements provide a monthly verification of snow conditions in locations where snow has been measured in the same manner as far back as 100 years.

Water year 2017 continues to build upon an already heavy snowpack. The snowpack in the San Joaquin, Tulare Lake, and both North and South Lahontan regions are above 175 percent of their April 1 historical average. The Sacramento and North Coast regions are also above their expected April 1 total. Of particular note, snow gaugers have reported all-time SWC records regardless of the month at the following thirteen snow courses: Bench Lake, Bond Pass, Clark Fork Meadow, Dana Meadows, Deadman Creek, Ellery Lake, Horse Meadow, Mount Rose, Rafferty Meadows, Rubicon Peak 1, Saddlebag Lake, Sawmill Ridge, and Sonora Pass. Once again we would like to recognize the snow surveying crews across the state for their tremendous efforts – many teams are arriving at snow surveying cabins which are buried to the top in this epic snowpack. That makes a long day even longer.

The results of the March 2017 statewide snow surveys are as follows:

Region	No. Courses Measured	Average WC (inches)	% Average April 1
North Coast	11	29.9	105
Sacramento	79	40.9	137
San Joaquin Valley	70	54.9	177
Tulare Lake	43	45.7	194
North Lahontan	17	48.1	183

South Lahontan	19	43.3	209
Statewide Average (weighted)			159

The automated snow sensor network shows similar results at the statewide level to those found in the manual snow course readings.

The snowpack as of the morning of April 10, 2017 stands at the following (based on snow sensors):

Region	Snow Water Equivalent (inches)	% of Average (Apr 1)	% of Average (Apr 10)
Northern	42.0	149	157
Central	51.1	177	180
Southern	43.7	166	170
Statewide	46.4	166	171

Weather and Climate Outlooks:

The 6-day weather forecast indicates precipitation Statewide, with the majority of precipitation falling on day 3 (Wednesday) and day 4 (Thursday). The North Coast is expected to receive the greatest amount of precipitation for the period, up to 3.3 inches. The Sacramento, San Joaquin, and Tulare Lake regions are expected to receive up to 2.6, 1.0, and 0.2 inches of precipitation. It should be noted up to 1.2 inches of precipitation is expected to fall over the eastside of the Sierras. Freezing levels will fluctuate over 3,000 feet for most basins. Freezing levels for the North Coast, Sacramento, San Joaquin, Tulare Lake and Eastside will range between: 3,000 to 8,000; 4,000 to 9,000; 6,000 to 10,000; 7,000 to 11,000; 5,000 to 10,000 feet, respectively.

The NWS Climate Prediction Center (CPC) one-month outlook for April, issued March 31, indicates equal chances of above or below normal precipitation statewide except the far northwest corner of the state where increased chances of above normal precipitation is expected. The same outlook predicts equal chances of above or below normal temperatures for the northern 2/3 of the state, elsewhere increased chances of above normal temperatures are expected.

The CPC three-month (April-May-June) outlook, issued March 16, indicates equal chances of above or below normal precipitation for all of the state. The same outlook predicts equal chances of above or below normal temperatures for the state except for the far southeastern area and the Colorado River basin where increased chances of above normal temperatures are expected.

ENSO-neutral conditions are present. Equatorial sea surface temperatures are near-average across the central and east-central Pacific. They are above average in the eastern Pacific Ocean. ENSO-neutral conditions are favored to continue through at least the Northern Hemisphere spring 2017, with increasing chances for El Niño development into the fall.

Next Update:

A Bulletin 120 update for conditions as of April 11, will be available on Thursday, April 13. The May 1, 2017 Bulletin 120 and Water Supply Index forecasts will be available on Monday, May 8, 2017. If you have any questions regarding this forecast, please contact a member of the Snow Surveys staff.